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Value Engineering

Making good Projects Great **WSDOT**

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What is Function Analysis System Technique?

The Function Analysis System Technique or FAST diagraming is just one of the tools used during the Function Analysis stage of a Value Engineering study, but it may also be one of the most important things a team may do to truly understand the basic need of a project.

The FAST diagram allows team members to communicate about project functions that require multi-disciplinary consideration. These functions are expressed in two-word descriptions comprised of an "active" verb and "measurable" noun. This concise description directs attention to the function of something, rather than focusing on the 'thing' itself. Thus allowing problems to be addresses objectively without the bias of a pre-determined solution.

Function Analysis
The Two-Word Definition

- Verb – Noun
- Forces Conciseness
- Separates Functions
- Fosters A Mutual Understanding
- ***What*** *must be done? not How it is being done?*

Examples of several Active Verbs and Measurable Nouns to answer:
"What does it do?" & "What does it do this to?"

ACTIVE VERBS			MEASURABLE NOUNS		
Apply	Guide	Mount	Area	Force	Noise
Attract	Grow	Prevent	Corrosion	Insulation	Power
Conduct	Impede	Protect	Damage	Light	Rust
Contain	Increase	Reduce	Energy	Liquid	Solids
Emit	Limit	Store	Friction	Load	Space
Enclose	Lead	Support	Flow	Money	Time
Fasten	Modulate	Transfer	Force	Metal	Vibration

Source for Lists: Rob Stewart & SAVE International with edits

Projects that usually provide the highest potential for value improvements are:

- Major reconstruction of existing highways.
- Projects with major traffic control.
- Projects with multiple stages.
- New alignment or bypass sections.
- Widening of existing highways for capacity improvements.
- Major structures. & Interchanges of multilane facilities.
- Projects with expensive environmental or geotech. requirements.
- Projects with difficult materials requirements/sources
- Projects with alternative solutions that vary the scope and cost

Introduction to the F.A.S.T. Diagram

There no one "Correct" F.A.S.T. diagram. The objective is to product a "valid" function model that represents the Basic purpose of the project and that all members of the team can reach consensus on.

The figure below illustrates the components included in a technical F.A.S.T. diagram for an Access Project. The Project Need & Purpose are built on the Major Logic path in the How ←→ Why direction. The project "Need" should be valid when read from right to left and left to right.

Example:

(NEED) = **Re-Distribute Regional Traffic Demand**
("HOW will this be accomplished?)

By

(PURPOSE) = **Improving Regional Mobility**
("HOW will this be accomplished?)

By

Reducing Congestion

Through to the Lower Order Function "Construction Project"
Likewise, by beginning with "Construct Project", the logic must be valid from right to left as well.

Example:

(LOWER ORDER) = **Construction Project**
("WHY are we Constructing the Project?)

To

Connect Freeways

And so on, back to Re-Distribute Regional Traffic Demand.

Click Here to Navigate to An Example of F.A.S.T. diagram elements explained

See the F.A.S.T. diagram below for the complete graphical illustration.